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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/052,886
Filing Date: January 18, 2002
Appellant(s): CHOUDHARY ET AL.

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GROUP 2600

Brian W. Oaks
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 06/06/07 appealing from the Office action mailed 02/22/07.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

No evidence is relied upon by the examiner in the rejection of the claims under appeal.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

DETAILED ACTION

Election/Restrictions

1. Claims 1-11, 20-36, 51, and 53-53 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 8/11/05.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 12 and 15-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Noe et al in the article "Comparison of Polarization Handling Methods in Coherent Optical Systems."

Regarding claim 12, Noe teaches generating a polarized local signal based on receiver-side feedback ("LO" in Figure 9); combining an ingress traffic signal with the polarized local signal to generate a combined signal ("PMC" in Figure 9); wherein the ingress traffic signal is compensated for polarization mode dispersion (see Figures 10-13; inherent in a polarization diversity receiver), splitting the combined signal into a first split signal and second split signal ("PBS" in Figure 9); detecting the first split signal (upper "FE" in Figure 9); and detecting the second split signal (lower "FE" in claim 9). Noe differs from the claimed invention in that Noe fails to specifically teach that polarized local light signal is

Regarding claim 15, Noe teaches that the first split signal comprises a first component of the received signal (inherent in the use of the PBS of Figure 9).

Regarding claim 16, Noe teaches that the second split signal comprises a second component of the received signal (inherent in the use of the PBS in Figure 9).

Regarding claim 17, Noe teaches that the ingress traffic is optical (inherent).

Regarding claim 18, Noe teaches that the combined signal is split by a polarization beam splitter ("PBS" in Figure 9).

Regarding claim 19, Noe inherently teaches that the polarization of a first component of the ingress traffic signal is aligned to an axis of the polarization beam splitter (inherent in that separation takes place at the PBS in Figure 9).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 14, 37, 39-50, and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Noe et al in the article "Comparison of Polarization Handling Methods in Coherent Optical Systems" in view of Brain et al in the article "Progress Towards the Field Deployment of Coherent Optical Fiber Systems."

Regarding claim 37, Noe teaches a means for receiving a signal, wherein the ingress traffic signal is compensated for polarization mode dispersion (see Figures 10-13, inherent in polarization diversity receivers).; a means for providing a local signal; a means for combining

the polarized local signal and received signal; a means for splitting the combined signal into a first split signal and a second split signal; a means for detecting the first split signal; a means for detecting the second split signal; and a means for generating feedback to modify the local signal (Figure 9 of Noe). Noe differs from the claimed invention in that Noe fails to specifically teach a means for controlling a polarization of the local signal to generate an appropriately polarized local signal. However, Brain, in the same field of optical communication, teaches that a means for controlling a polarization of the local signal to generate an appropriately polarized local signal is well known in the art (Figure 1). One skilled in the art would have been motivated to employ a means for controlling a polarization of the local signal to generate an appropriately polarized local signal in order to maximize the IF signal at the output of the receiver (Brain page 425 right column, first paragraph). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to employ a means for controlling a polarization of the local signal to generate an appropriately polarized local signal.

Regarding claim 39, the combination of references and Brain in particular teaches that the signal is received by an automatic polarization controller (as seen in Figure 1 of Brain).

Regarding claim 14, 40, 45, Noe differs from the claimed invention in that Noe fails to specifically teach that the polarization is circular polarization. However, Brain teaches the ability to match the state of polarization of an incoming optical signal via the use of an automated polarization control system for controlling the polarization of a local light source (Figure 1). Brain's automated polarization control system clearly includes the ability to produce light having a circular polarization (e.g. "limitless range of polarization adjustment" of Brain page 425 right column, first paragraph). One skilled in the art would have been motivated to

produce circular polarization with the light source of Noe in order to maximize the output of the IF signal at the output of the receivers (Brain page 425 right column, first paragraph). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to produce circular polarization via the polarization controller taught by Brain in the device of Noe.

Regarding claim 41, Noe teaches that the first split signal comprises a first component of the received signal (inherent in Figure 9).

Regarding claim 42, Noe teaches that the second split signal comprises a second component of the received signal (inherent in Figure 9).

Regarding claims 43, Noe teaches that the ingress traffic is optical (inherent).

Regarding claim 44, the combination of references and Brain in particular teaches that a continuous wave laser provides the local signal (Brain page 425 left column, first paragraph).

Regarding claim 46, the combination of Noe and Brain differs from the claimed invention in that Noe fails to specifically teach that a quarter-wave plate controls the polarization of the system. However, the use of quarter-wave plates to control polarization is well known in the art. One skilled in the art would have been motivated to use a quarter-wave plate control the polarization of the system since they are readily available and relatively inexpensive. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to employ a quarter-wave plate as the polarization controllers of the system of Noe and Brain.

Regarding claims 47-48, the combination of Noe and Brain differs from the claimed invention in that Noe fails to specifically teach that the combiner is a half-mirror or a 3dB splitter. However, both types of combiners are well known in the art and readily available. One

skilled in the art would have been motivated to employ wither one in order to meet a design requirement or to use what was available at the time. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to employ either a half-mirror or a 3dB splitter in the system of Noe.

Regarding claim 49, Noe inherently teaches that the polarization of a first component of the ingress traffic signal is aligned to an axis of the polarization beam splitter (inherent in that separation takes place at the PBS in Figure 9).

Regarding claim 50, Noe inherently teaches that the detecting means is a photodiode (inherent in the detection of optical signals).

Claim 52 recites a combination of individually rejected elements and is therefore rejected on the same grounds as stated above.

(10) Response to Argument

The Appellant argues that the claim is allowable at least because Noe fails to specifically teach that "the ingress traffic signal is compensated for polarization mode dispersion." However, the examiner disagrees for three reasons.

First, the examiner contends that the claim language fails to positively recite what the Appellant now argues. As stated in the Brief, the Appellant contends that the claimed compensation for polarization mode dispersion occurs at some point prior to being combined with the polarized local signal and prior to being split. In other words, the compensation for polarization mode dispersion of the ingress signal is performed by an element, i.e. a polarization mode dispersion compensator, at some point before even entering the system of the claimed invention. This polarization mode dispersion compensator element, while disclosed in the

specification, is neither positively recited nor easily inferred from the claim language. In matters such as these, it has been judicially determined that USPTO personnel are to give claims their broadest reasonable interpretation in light of the supporting disclosure. In re Morris, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Limitations appearing in the specification but not recited in the claim should not be read into the claim. E-Pass Techs., Inc. v. 3Com Corp., 343 F.3d 1364, 1369, 67 USPQ2d 1947, 1950 (Fed. Cir. 2003) (claims must be interpreted "in view of the specification" without importing limitations from the specification into the claims unnecessarily). In re Prater, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550- 551 (CCPA 1969). See also In re Zletz, 893 F.2d 319, 321-22, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989).

In fact, what the claim language does recite is:

"combining an ingress traffic signal with the polarized local signal to generate a combined signal, ***wherein*** the ingress traffic signal is compensated for polarization mode dispersion;"

Given that Appellant's "wherein" clause immediately follows a positively recited method step, the examiner has interpreted the claim language as disclosing that the compensation for polarization mode dispersion occurs in the combining of the ingress traffic signal with a polarized local light signal, given that the term "wherein" is commonly defined as "in which." In other words, after generation of a polarized local light signal based on receiver-side feedback, the ingress traffic signal is combined with the polarized local signal to generate a combined signal. Then, apparently through this combination of polarized local signal and ingress traffic signal, the ingress traffic signal is compensated for polarization mode dispersion. As a side note,

Appellant's wherein clause appears to directly contradict Appellant's argument that the polarization mode dispersion compensation takes place via a polarization mode dispersion compensation element before the signal is even input to the system.

Second, the Noe reference meets the all of the structural limitations of the claim by disclosing a polarized local light generator that receives receiver-side feedback, a combiner for ingress traffic signals and the polarized local light signal, a splitter for splitting the combined signal, and a pair of detectors. There being no apparent structural difference between the claimed invention and the cited prior art, the examiner contends that the claim language fails to distinguish the claimed invention from the prior art. Furthermore, the cited prior art is clearly structurally able to combine the ingress traffic signal with the polarized local signal, and as such should produce the same result as the Appellant's claimed invention: compensation of the ingress traffic signal for polarization mode dispersion.

Lastly, from purely technical point of view, the Noe reference clearly discloses that compensation for polarization mode dispersion occurs. Polarization mode dispersion is a phenomenon that occurs when a signal pulse is introduced into a fiber. Each signal pulse is actually comprised of a two pulse components with each pulse component aligned in a polarization state, with the polarization states typically being orthogonal. As these two pulse components propagate through the fiber, they each independently encounter distinct fiber irregularities that include impurities in the fiber core, imperfect core geometry, and external pressure or vibration. These irregularities present obstacles along the path of propagation and act to independently delay the pulse components so that at the receiver the pulse components arrive at different times, resulting in a broadened pulse and generally termed polarization mode

dispersion. The broadening of the pulse due to polarization mode dispersion also has the effect of reducing the power of the pulse of the receiver, thereby making it difficult for the receiver to determine whether a "1" data bit pulse was received or a "0" data bit pulse was received. This difficulty gives rise to bit errors. The goal of a polarization mode dispersion compensation is to counteract the various obstacles or delays to the pulse components by realigning the pulse components in time so that they arrive at the receiver at the same time. Realignment of the pulse components occurs via use of a various delay elements for each pulse component that work to delay one or both of the pulse components relative to the other so that they realign in time at the receiver.

Turning to the prior art, Noe is clearly aware of the problem posed by polarization mode dispersion in that Noe acknowledges that separated pulse components can not simply be combined due to their difference in phase (page 1358 second column), a term used to describe the difference in the arrival time of two pulse components. To counteract this phase difference or difference of arrival time of the pulse components at the receiver, Noe discloses the use of delay-and-multiply demodulators (page 1358 second column). These delay-and-multiply demodulators act to counteract the phase difference between the two components, and in doing so also counteract the effects of polarization mode dispersion in that the delay-and-multiply demodulators provide the amount of delay necessary to each component to ensure alignment of the pulses when they are combined and fed to the baseband electronics for decision as to whether a "1" pulse was received or a "0" pulse was received. Evidence of the reduction of the effects of polarization mode dispersion can be seen in Figure 13 that clearly shows a reduction in the bit error rate versus power. It bears repeating that received power is important in that the greater the

effects of polarization mode dispersion on individual pulse components, the more a pulse will broaden when the components are combined, thereby resulting in reduced pulse power at the receiver. This reduction in pulse power at the receiver results in the inability of the receiver to determine whether a "1" pulse has been received or a "0" pulse has been received, which then manifests itself as bit errors. Therefore, the greater the phase correlation between the components, the higher the received pulse power at the receiver, resulting in fewer bit errors which is clearly shown in Noe's Figure 13.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

A. Bello

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